

## WHAT IS CLAIMED IS:

1. A vibration isolation system for at least partially damping and isolating vibrations of a body, the system comprising:
  - a plurality of active isolator devices mechanically coupled to the body; and
  - a control system configured to control the active isolator devices, wherein the control system is configured to: decouple vibrations in modal directions; determine a modal compensation signal for each modal direction; recouple each modal compensation signal into an active isolator control signal for each active isolator device; and stabilize at least one unstable natural mode of the body.
2. The vibration isolation system according to claim 1, wherein the at least one unstable natural mode stabilized by the control system is directed substantially vertically.
3. The vibration isolation system according to claim 1, wherein the body is positioned on a base frame by air mounts.
4. The vibration isolation system according to claim 1, wherein a passive isolator device and an active isolator device engage the body at the same location on the body.
5. The vibration isolation system according to claim 1, wherein the system comprises a plurality of sensors to detect vibrations of the body.
6. A lithographic apparatus, comprising:
  - an illumination system configured to provide a beam of radiation;
  - a support configured to support a patterning device, the patterning device configured to impart the beam with a pattern in its cross-section;
  - a substrate table configured to hold a substrate; and
  - a projection system configured to project the patterned beam onto a target portion of the substrate, wherein the projection system is supported by and positioned relative to a metrology frame, vibrations of the metrology frame being at least partially isolated and damped by a plurality of active isolator devices which are controllable by a control system, the control system being configured to: decouple vibrations in modal directions; determine a modal compensation

signal for each modal direction; recouple each modal compensation signal in an active isolator control signal for each active isolator device; and stabilize at least one unstable natural mode of the metrology frame.

7. An apparatus according to claim 6, wherein the at least one unstable natural mode stabilized by the control system is directed substantially vertically.

8. An apparatus according to claim 6, wherein the projection system is positioned on the metrology frame by air mounts.

9. An apparatus according to claim 6, wherein a passive isolator device and an active isolator device engage the projection system at the same location on the projection system.

10. An apparatus according to claim 6, further comprising a plurality of sensors to detect vibrations of the projection system.

11. A vibration isolation method for at least partially isolating and damping vibrations of a body, the method comprising:

detecting vibrations in the body;

decoupling the detected vibrations in modal directions;

determining a modal compensation signal for each modal direction;

recoupling the modal compensation signal to an active isolator control signal for each of a number of active isolator devices which are mechanically coupled to the body; and

feeding the active isolator control signals to the respective active isolator devices,

wherein at least one unstable natural mode of the body is stabilized.

12. A method according to claim 11, wherein the at least one unstable natural mode that is stabilized is directed substantially vertically.

13. A method according to claim 11, wherein the body is positioned on a base frame by air mounts.

14. A method according to claim 11, wherein a passive isolator device and an active isolator device engage the body at the same location on the body.
15. A method according to claim 11, wherein the vibrations of the body are detected by a plurality of sensors.
16. A device manufacturing method comprising the steps of:  
providing a substrate;  
projecting a patterned beam of radiation onto a target portion of the substrate,  
wherein disturbing vibrations in a system performing the projecting of the patterned beam of radiation are prevented by:  
detecting vibrations in the projecting system;  
decoupling the detected vibrations in modal directions of the projecting system;  
determining a modal compensation signal in each modal direction;  
recoupling the modal compensation signal into an active isolator control signal for each of a number of active isolator devices which are mechanically coupled to the projecting system;  
and  
feeding the active isolator control signals to the respective active isolator devices,  
wherein at least one unstable natural mode of the projecting system is stabilized.
17. An apparatus according to claim 16, wherein the at least one unstable natural mode stabilized by the control system is directed substantially vertically.
18. An apparatus according to claim 16, wherein the projection system is positioned on the metrology frame by air mounts.
19. An apparatus according to claim 16, wherein a passive isolator device and an active isolator device engage the projection system at the same location on the projection system.
20. A method according to claim 16, wherein the vibrations of the projection system are detected by a plurality of sensors.